

September 15, 2003

TO: Internal File

THRU: Peter H. Hess, Environmental Scientist III/Engineering, Team Lead

FROM: Priscilla W. Burton, Environmental Scientist III/Soils

RE: Degasification Wells G-1 G-2 G-3, Canyon Fuel Company, LLC., Dugout Canyon Mine, C/007/039-Task #1642

SUMMARY:

The submittal, received on August 1, 2003, describes the location and development of three ventilation boreholes for the Rock Canyon seam to reduce methane along the longwall panel. Supplemental information was received by the Division's Salt Lake Office on August 13, 2003, August 29, and September 5, 2003.

The three de-gas drill holes are in T 13 S, R 12 E, Section 24 and T 13 S, R 13 E, Section 19, as shown on Figure 1-1 and Plate 1-4. The wells will add an estimated 2.24 acres to the permit area (Table 1-2). The land is owned by the Thayn Family Trust. This property falls under the Surface Land Owner Agreement dated November 22, 1999, and First Amendment to Surface Use Agreement dated August 13, 2001 between Canyon Fuel Company (CFC) and Thayn. As required by these agreements, CFC will contact Thayn in writing of the proposed disturbance (Section 412.200).

The soils to be disturbed were not analyzed during the topsoil survey. The Permittee commits to sample and analyze the salvaged topsoil from sites G-1, G-2, and G-3 for the following parameters during soil salvage: pH, Electrical Conductivity, Sodium Adsorption Ratio, percent CaCO₃, plant available Nitrogen, Potassium, and Phosphorus (Section 243).

The submittal is recommended for approval.

TECHNICAL ANALYSIS:

TECHNICAL MEMO

GENERAL CONTENTS

REPORTING OF TECHNICAL DATA

Regulatory Reference: 30 CFR 777.13; R645-301-130.

Analysis:

Baseline soils information (Attachment 2-1) was compiled by Mr. Dan Larsen (Soil Scientist) with EIS Environmental and Engineering Consulting. Mr. Larsen's resume is attached with the report.

Attachment 2-2 (topsoil calculations) was prepared by Layne Jensen of EarthFax Engineering, Inc. Mr. Jensen is a professional engineer. The address and credentials of the company or individual are attached to the report.

Dr. John A. Senulis, owner of SENCO-PHENIX, Price, Utah, conducted an archaeological investigation. Dr. Senulis' credentials are attached to the report.

Findings

The information provided meets the requirements for the reporting of technical data requirements of the regulations.

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.12; R645-301-411.

Analysis:

Attachment 4-1 contains the results of a cultural resource survey conducted by Senco-Phenix of Price Utah in June 2003. There were no cultural resources located within the 56-acre area surveyed.

The report documents previous surveys filed with the Utah Division of State History in which one archeological site and two cultural resources were mentioned. Neither cultural resource was recommended for nomination to the historic register. The archaeological site (42CB292) is the historic Snow Mine in Pace Canyon. The location of this site is shown on a map in the June 2003 report. Avoidance of this site was recommended pending further historic research. The archaeological site is located along the Pace Canyon road that will be used to access the drill hole sites. The Permittee has provided assurance that the degas hole developments will not impact what remains of the archaeological site.

Findings:

The information meets the minimum requirements for Historic and Archaeological Resource Information.

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.21; 30 CFR 817.22; 30 CFR 817.200(c); 30 CFR 823; R645-301-220; R645-301-411.

Analysis:

Attachment 2-1 provides a soil inventory for six potential well sites. The inventory was conducted by Mr. Dan Larsen in June 2003. This proposal is concerned only with sites G-1, G-2, and G-3. Site sketches provide valuable estimates of topsoil thickness over the entire site (Appendix 6-7 of Attachment 2-1). Mr. Larsen states in the introduction that each site will be developed to a 0.5-acre size and therefore topsoil calculations must be adjusted for the larger sites described by the application.

Site G-1:

The 1988 Soil Survey of Carbon County Utah (an Order 3 soil survey) places G-1 in the Rabbitex family – Datino Variant complex (Appendix 6.2 – 6.4 of Attachment 2-1). The site is located on a ridge with a gentle north pitch and was previously disturbed by logging and soils are compacted and displaced. Closer inspection suggests the site has some characteristics of the Midfork-Commodore Complex and the profile description (Appendix 6-6 of Attachment 2-1) for the site places it in the Comodore Series Loamy-skeletal, mixed, superactive, frigid Lithic Haplustolls). Topsoil is estimated at between 5 and 14 inches (Appendix 6-7 of Attachment 2-1). Lithic contact at 14 inches.

TECHNICAL MEMO

According to the information provided in Appendix 6-4 of Attachment 2-1 the Commodore Series is a shallow soil with a surface layer of nine inches over extremely stony subsoil. Lithic contact (bedrock) ranges from 10 - 20 inches. The effective rooting depth of Commodore soils is 20 inches. The potential plant community in this series is Douglas-fir and canopy of 50%, and understory including 40% grasses, 15 forbs, and 45% shrubs. The important plants are Rocky Mountain Juniper, birchleaf mountain mahogany, snowberry Salina wildrye, slender wheatgrass, Elk sedge, and Indian ricegrass. The Commodore series is in the Mountain Very Steep Stony Loam (Douglas-fir) woodland site. In a normal year productivity is expected to be 500 lbs/acre (1988 Carbon County Soil Survey).

Site G-2:

The 1988 Soil Survey of Carbon County Utah (an Order 3 soil survey) places G-2 in the Beje-Trag complex (Appendix 6.2 – 6.4 of Attachment 2-1). The site is located along a swale and a slight alluvial fan and is vegetated with sagebrush/grass and a few small juniper trees. Closer inspection of the site places it in an inclusion of the Brycan soil series (fine loamy, mixed, superactive, frigid Cumulic Haplustolls). The slope is between 8 – 15% to the east and north. Topsoil is estimated at 30 inches but is greater than 40 inches in the southeast corner (Appendix 6-7 of Attachment 2-1).

The Brycan soil series are very deep soils with a mollic epipedon 20 – 36 inches thick. The effective rooting depth is twenty inches. Brycan soils are formed in sloping alluvial valleys at high elevation. The potential plant community on the Brycan soil is 60 % grasses, 10 % forbs, and 30 % shrubs. The important plants are mountain big sagebrush, Antelope bitterbrush, Utah serviceberry, snowberry, Indian ricegrass, bluebunch wheatgrass, Letterman needlegrass, and Salina wildrye. The Brycan series is in the Mountain Loam (Salina Wildrye) range site. In a normal year productivity is expected to be 1,500 lbs/acre (1988 Carbon County Soil Survey).

Site G-3:

The 1988 Soil Survey of Carbon County Utah (an Order 3 soil survey) places G-3 in the Beje-Trag complex (Appendix 6.2 – 6.4 of Attachment 2-1). The site is located on a ridge and is vegetated with sagebrush, snowberry, and “associated species”. The site has a 10 – 20 % gradient to the east. Topsoils ranges from 8 inches on the west and northwest to 16 inches on the south and southeast (Appendix 6-7). The profile description (Appendix 6-6 of Attachment 2-1) identifies the soil type as Trag (Fine-loamy, mixed, superactive, frigid Typic Argiustolls).

The Trag Series consists of very deep soils formed from weathered bedrock. The nine-inch topsoil layer transitions to a six-inch BA layer (having characteristics of both A and B horizons). The mollic epipedon is the zone from 0 – 15 inches. The soil has an argillic horizon from 15 – 35 inches. The effective rooting depth is 60 inches. The potential plant community on the Trag soil is 60% grasses, 15% forbs, and 25% shrubs. Important plants are Antelope

bitterbrush, Utah serviceberry, Mountain big sagebrush, snowberry, Salina wildrye, bluegrass, bluebunch wheatgrass, Indian ricegrass, and Letterman needlegrass. The Trag soil is in the Mountain Loam (Salina Wildrye) range site. In a normal year productivity is expected to be 1,500 lbs/acre (1988 Carbon County Soil Survey).

Soils were not analyzed during the topsoil survey. The application indicates that the topsoil from G-1, G-2 and G-3 will be analyzed for the following parameters during soil salvage: pH, Electrical Conductivity, Sodium Adsorption Ratio, percent CaCO₃, plant available Nitrogen, Potassium, and Phosphorus (Section 243).

Findings:

The information provided meets the minimum requirements for Soils Environmental Resource Information.

LAND-USE RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.22; R645-301-411.

Analysis:

The pre-mining land use is open range for wildlife and livestock and hunting as described in Chapter 4. Table 3-1 provides productivity estimates between 300 – 1,500 lbs/ac (NRCS letter in Attachment 3-1). The highest productivity sites are G-2 and G-3 (Trag and Brycan soils) and the lowest productive is site G-1 Comodore series soil, previously disturbed by roads and logging.

The land is owned by the Thayn Trust and is the subject of the Surface Use Agreement between Canyon Fuels Co. and the Thayn Trust dated November 22, 1999 and the First Amendment to the Surface Use Agreement dated August 13, 2001 (Attachment 4-2). This agreement describes hunting as another use of the land. Communication with the landowner is found in Attachment 4-2.

Findings:

The information provided meets the Land Use requirements of the Regulations.

ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR 785.19; 30 CFR 822; R645-302-320.

TECHNICAL MEMO

Analysis:

Alluvial Valley Floor Determination

The two sites are at elevations of 8,200 to 8,400 feet on the plateau between Dugout Canyon and Pace Canyon. Alluvial sediments deposited by Dugout and Pace Creek drainages are far below the site as shown on Plate 6-1 of the MRP. Although Site G-2 has soils in the Brycan series that developed from alluvial deposition, they are presently not being irrigated or cultivated. Site G-2 is currently being used for open range.

Findings:

The Division finds that the site is not located in an alluvial valley floor.

PRIME FARMLAND

Regulatory Reference: 30 CFR 785.16, 823; R645-301-221, -302-270.

Analysis:

Prime farmland does not exist at this elevation in the Book Cliffs. The growing season is short (60 days) and there is no developed water source. The Utah Agricultural Experiment Station Research Report Number 76 entitled "Important Farmlands of Parts of Carbon, Emery, Grand, and Sevier Counties" does not include R 12 E, T 13 S.

Regulation R645-302-313 requires that a reconnaissance inspection is done for all permit applications whether or not Prime Farmland is present and that the Division and Natural Resource Conservation Service will determine the extent of the reconnaissance inspection. On April 24, 2003, the Division consulted with Gary Roeder, Area Conservationist with the NRCS Price Field Office. Mr. Roeder stated that developments anywhere in the permit area at these elevations would not fit the parameters of prime farmland.

Findings

The Division in consultation with the Natural Resources Conservation Service determines that there are no prime farmlands in the location of the proposed degasification wells G-1, G-2 and G-3.

OPERATION PLAN

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

Analysis:

Topsoil Removal and Storage

Site G-1:

Table 1-2 states G-1 will be 0.6 acres of disturbance. Table 2-1 indicates 415 cu yds of topsoil will be salvaged (average depth of salvage is stated as 7 inches in Section 222.400). Figure 5-1 provides a contour map. Figure 5-2 provides the site layout during construction. Figure 5-3 provides cross-sections for site development. Figure 5-4 provides the operational layout for the life of mine. A fifty-five foot access road will be developed (personal communication with Chris Hansen and Vicky Miller on August 6, 2003).

The Division expects this site will generate 8,450 cu ft of material (313 cu yds) of topsoil and the access road (40 ft X 25 ft) will generate an additional 550 cu ft or 18.5 cu yds. This is an average of 0.58 feet of topsoil salvaged from the site. EarthFax calculations for soil salvage are provided in Attachment 2-2. They are 10,398 cu ft for the pad (385 cu yd) and 802 cu ft (29 cu yds) for the road. The Permittee's estimate of recoverable topsoil (Table 2-1) exceeds the Division's for site G-1. Projected topsoil dimensions are 55 ft x 35 ft x 16 ft high (Table 2-2).

The plan indicates that 6 inches of subsoil will be salvaged and stored in a berm around the site. Appendix 6-6 of the soil survey indicates that there is approximately 7 inches of subsoil and that bedrock is encountered at 14 inches. The Division estimates that seven inches of subsoil over the 0.5-acre site would provide about 400 cu yds of subsoil for use in the berms. The perimeter of the site is shown on figure 5-3 as 500 feet (not including topsoil stockpile). The berm design is described in Appendix 7-1, the volume of soil required for construction of the berm is estimated at 161 cu yd (Section 231.100). The Division estimates that approximately 185 cu yds is required for the 5 ft x 2 ft x 500 ft berm for the majority of the site. In either case, there should be plenty of subsoil for the berm construction around the perimeter and around the topsoil stockpile.

Figure 5-2 indicates in cross section A-A that the site will be cut to a depth of about 3-4 feet on the west side (hard to tell from the scale). Cross-section B-B indicates that the mud pit will be incised to a depth of nine feet on the south of the site. At site G-1 shallow depth to bedrock may require a portable container for drilling fluid.

TECHNICAL MEMO

Site G-2:

Table 1-2 states G-2 will be 1.21 acres of disturbance. Table 2-1 indicates 3,104 cu yds of topsoil will be salvaged (average depth of salvage is stated as 30 inches in Section 222.400). Figure 5-5 provides site contours. Figure 5-6 provides typical cross-sections. Figure 5-7 shows the construction layout, approximate dimensions are 155ft x 135 ft or 20,925 sq ft, or about 0.5 acres. Figure 5-8 shows the operational layout for the life of mine, no dimensions are presented. A three hundred seventy foot access road will be developed to the site (personal communication with Chris Hansen and Vicky Miller on August 6, 2003).

The Division expects this site will generate 47,125 cu ft of material (1,745 cu yds) of topsoil and the access road (370 ft X 20 ft) will generate an additional 713 cu yds. This is an average of thirty inches topsoil salvaged from the site. EarthFax calculations for soil salvage are provided in Attachment 2-2. They are 58,612 cu ft for the pad (2,170 cu yd) and 25,185 cu ft (933 cu yds) for the road. The Permittee's estimate of recoverable topsoil (Table 2-1) exceeds the Division's for site G-2. Proposed dimensions for the stockpile are 156 ft x 50 ft x 20 ft high (Table 2-2).

Figure 5-6 cross section A-A' shows a twelve foot cut slope on the northeast half of the site. No cut/fill calculations are presented, but the Division estimates that after the 30 inches of topsoil is removed, this cut will generate 54,375 cu ft of soil (2,013 cu yds), based on the average 4 ft depth of cut to level the northeast section of the site. The berm design is described in Appendix 7-1; the volume of soil required for construction is estimated at 254 cu yds (Section 231.100). In either case, there should be plenty of subsoil for the berm construction around the perimeter and around the topsoil stockpile.

Site G-3:

Table 1-2 states G-3 will be 0.97 acres of disturbance. Table 2-1 indicates 1,182 cu yds of topsoil will be salvaged (average depth of salvage is stated as 12 inches in Section 222.400). Figure 5-9 provides a contour map. Figure 5-11 provides the site layout during construction. Figure 5-10 provides cross-sections for site development. Figure 5-12 provides the operational layout for the life of mine. A ninety-foot access road will be developed (personal communication with Chris Hansen and Vicky Miller on August 6, 2003).

The Division expects this site will generate 24,000 cu ft of material (888 cu yds) of topsoil and the access road (90 ft X 20 ft) will generate an additional 66 cu yds. This is an average of twelve inches topsoil salvaged from the site. EarthFax calculations for soil salvage are provided in Attachment 2-2. They are 29,805 cu ft for the pad (1,104 cu yd) and 2,118 cu ft (78 cu yds) for the road. The Permittee's estimate of recoverable topsoil (Table 2-1) exceeds the Division's for site G-3. Proposed dimensions for the stockpile are 70 ft x 60 ft x 17 ft high (Table 2-2).

Figure 5-10 cross section A-A' shows a twelve to fifteen foot cut slope on the southern two-thirds of the site. No cut/fill calculations are presented, but the Division estimates that after the 12 inches of topsoil is removed, this cut will generate 39,750 cu ft of soil (1,472 cu yds), based on the average 5 ft depth of cut to level the southern two-thirds of the site. The berm design is described in Appendix 7-1; the volume of soil required for construction is estimated at 208 cu yds (Section 231.100).

All sites:

The volume of material excavated for the mud pit at each site is estimated at 97 cu yds (Section 231.100).

The topsoil stockpiles will be within the perimeter fence so that the stockpiles are not overgrazed. Berms around the topsoil stockpiles will be constructed of subsoil.

Vegetation will be removed and stored on the perimeter of the disturbed area for use in reclamation (Section 231.100) or alternatively hauled offsite for disposal (Section 232.600) at the discretion of the Permittee. The Division's preference is for the grubbed vegetation to remain on site to be used as cover and protection for the reclaimed site.

A qualified person will supervise the soil salvage operations (Section 231.100). Steepness of grade has not been cited as a limitation to topsoil salvage at these sites (Section 232.700). A dozer or front-end loader will be used for topsoil removal (Section 232.100). The stockpile dimensions for each site are outlined in Table 2-2. Slopes of the stockpile will be 1h:1v (Section 231.400). Slopes will be reduced to 2h:1v during the operational phase of the site and before seeding (personal communication with Vickie Miller on September 3, 2003). (The Division requested that operational slopes of the topsoil piles are no greater than 2h:1v as this is generally considered to be the angle of repose for unconsolidated soils.)

A berm or silt fence will be constructed around the stockpile and the stockpile will be roughened and seeded with the mix described in Table 3-2 (Section 234.200).

A commitment in Section 243 of the application indicates that during salvage, the soils of G-1, G-2, and G-3 will be analyzed for the following parameters: pH, Electrical Conductivity, Sodium Adsorption Ratio, percent CaCO_3 , plant available Nitrogen, Potassium, and Phosphorus.

Findings:

Slopes will be reduced to 2h:1v during the operational phase of the site and before seeding (personal communication with Vickie Miller on September 3, 2003). The information provided meets the minimum requirements of the Operation Plan, Topsoil and Subsoil removal.

TECHNICAL MEMO

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Acid- and Toxic-Forming Materials and Underground Development Waste

The well design is shown on Figure 5-16. The well will be drilled to a depth twenty feet above the coal seam (approximately 2,000 feet). Fragments of various rock strata will be brought to the surface with the air drill along with any water encountered. After drilling is completed, the mud pit will be allowed to dry and the drilling fragments will be mixed with the excavated subsoil from the mud pit. This practice should reduce any potential concentrations of salinity or acidity.

Previous investigations have not found acid or toxic materials in the strata (Section 623 and Appendix 6-1 and 6-2). Water was encountered during drilling at this location at a depth of about 1500 feet. There has been no water reported during monitoring in this vicinity. The Division does not expect there to be a problem with acid/toxic materials and does not expect there will be much water encountered in the drilling.

Findings:

The information provided is adequate for the purposes of the Regulations.

RECLAMATION PLAN

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

Redistribution

The reclamation timetable is shown on Figure 5-15. The first phase of reclamation will occur immediately after drilling and reduce the operational area to that area needed for the access

road, fan and topsoil storage. The remaining area will be graded, topsoiled, roughened, seeded, and mulched (see Figures 5-4, 5-8, and 5-12).

The plan describes the reclamation of the drilling mud pits in Section 242.100. The mud pit will be allowed to dry; and will be filled with soil that will be compacted to minimize settling. There will be mixing of the cover material with the rock fragments and sediments of the mud pit to avoid creating an abrupt boundary between the layers.

The plan indicates that site will be ripped to a depth of eighteen to twenty-four inches (Section 242.100 and 341.200) to reduce compaction.

Topsoil will be re-spread using a trackhoe. The soils will be handled when loose and friable (not too wet, not too dry), see Section 242.100. Redistribution thickness is shown in Table 2-3.

The soils will be analyzed during soil salvage for the following parameters: pH, Electrical Conductivity, Sodium Adsorption Ratio, percent CaCO₃, plant available Nitrogen, Potassium, and Phosphorus (Section 243) to determine if amendments are needed.

Findings:

The information provided meets the minimum requirements of the Reclamation Topsoil Redistribution Regulations.

CONTEMPORANEOUS RECLAMATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.100; R645-301-352, -301-553, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

General

The reclamation timetable is shown on Figure 5-15. The first phase of reclamation will occur immediately after drilling and reduce the operational area to the access road, the fan, the well and the topsoil storage pile. The reclaimed area will be graded, topsoiled, roughened, seeded, and mulched. A topsoil pile will remain for reclamation of the operational area. See Figures 5-4, 5-8, and 5-12. Reclamation of the mud pit is not described.

The concept of immediately stabilizing the site is sound.

The site will be fully reclaimed upon cessation of methane venting (Section 541).

TECHNICAL MEMO

Findings:

The information provided is adequate for the purposes of the regulations.

STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

Analysis:

The area will be ripped to a depth of 18 – 24 inches (Section 242.100).

Erosion control measures will include silt fences and berms (Section 231.100), seeding, and mulching of the soils (244.200 and 341.200). Disruptive gullies (greater than nine inches) will be reseeded (244.300). Surfaces will be left rough. Mulch will be applied at 2,000 lbs/ac with a tackifier Section 341.200).

The Permittee should contemplate the addition of mulch generated from the grubbing of vegetation. This would be an inexpensive method of adding surface protection.

Findings:

The information provided is adequate for the purposes of the regulations.

RECOMMENDATIONS:

The site development will not affect the Snow Mine Archaeological site along the Pace Canyon Road.

The Permittee has described salvage and replacement of topsoil. The calculations for topsoil salvage exceed the Division's estimates, but are supported by the consultant's report in Attachment 2-2. Topsoil storage piles will be within the perimeter of the fence and during the operational phase and before seeding, the topsoil pile slopes will be no greater than 2h:1v. The Permittee is encouraged to utilize grubbed vegetation as protection on the reclaimed soil surface and on the surface of the topsoil piles.

The Permittee will construct all berms of subsoil.

The Permittee notified the Thayn Trust as described in the Surface Use Agreement and First Amendment to the Surface Use Agreements (Attachment 4-2).

The Permittee has committed to sampling and analysis of the salvaged topsoil from all sites during development. Topsoil will be analyzed for the following parameters during soil salvage: pH, Electrical Conductivity, Sodium Adsorption Ratio, percent CaCO₃, plant available Nitrogen, Potassium, and Phosphorus (Section 243). The information gained from this analysis should be placed in the MRP.

The application is recommended for approval at this time.